Submission form for Ocean-Shot Concepts-Round 2

Response ID:40 Data

1. (untitled)

1. Ocean-Shot Contact Information: *Note - This information will be shared with the National Committee for the Ocean Decade in order to receive feedback. It will also be made publicly available if the Ocean-Shot concept is accepted into the Ocean-Shot Directory.

Primary Contact Name (First & Last) : Winslow Burleson
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2. Ocean-Shot Title

Just, Equitable, Diverse, and Inclusive (JEDI) Aquanautics: Democratizing Innovation in the Networked Blue Economy

3. Author(s): *Please list contributors to the submitted Ocean-Shot concept with first and last names in the order you wish them to be referenced for *potential* use in the Ocean-Shot Directory. Examples can be found here:

Michael Lombardi, and Danielle Harlow

4. Ocean-Shot Directory Summary (Please provide a short introduction/description of the Ocean-Shot concept for *potential* use in the Ocean-Shot Directory, 100 word limit. Examples can be found here.):

JEDI Aquanautics will fuse the world's most powerful experiential supercomputer, the NSF Holodeck, with Ocean Space Habitat'sSM transformative capabilities--creating a world-class sociotechnical convergence catalyst for the Networked Blue Economy (NBE). JEDI "Inventioneering" will foster open-access passion-based convergence research, education, and innovation to inspire and train the next generation of lifelong learners and innovators. The overarching project vision is to lay the foundations of a vibrant JEDI Aquanautics ecosystem across academia, industry, government, public and private organizations, diverse multi-stakeholder communities and end-users. Significantly increasing human engagement with ocean environments, JEDI Aquanautics will deliver profound benefits throughout the global NBE.

5. Abstract (describe hypothesis, scientific and/or technological objective, 200 word limit):

JEDI Aquanautics will fuse the world's most powerful experiential supercomputer, the NSF Holodeck with the transformative capabilities of Ocean Space HabitatSM to create a world-class sociotechnical convergence catalyst—the JEDI Aquanautics Platform. Through integrated convergence research and open-access cyberlearning we will engage a national and international community in transforming "underwater tents" into smart and connected aquanautics infrastructure, tightly integrating Networked Blue Economy (NBE) applications (marine archaeology, biopharmaceutical prospecting, ecological preservation, aquaculture, and planetary exploration, among these) in partnership with diverse communities. We will launch an international JEDI Inventioneering initiative, fostering open-access passion-based convergence research, education, and innovation to inspire and train the next generation of lifelong learners and innovators—significantly increasing human access to, and understanding of, ocean environments and sustainable resource utilization. To ensure that we engage and inspire JEDI exploration, discovery, and innovation throughout the NBE, we will launch an international JEDI Aquanautics Network Improvement Community (NIC), employing NSF INCLUDES methodologies. The overarching project vision is to lay the foundations of a vibrant JEDI Aquanautics ecosystem across academia, industry, government, public and private organizations, diverse multi-stakeholder communities and end-users. JEDI Aquanautics will deliver profound and transformative benefits to American society and pioneer a JEDI global NBE.

6. Please select the challenges (no more than 3) that are most relevant to your concept (Expanded reference below):

Challenge 4: Generate knowledge, support innovation, and develop solutions for equitable and sustainable development of the ocean economy under changing environmental, social and climate conditions.
Challenge 9: Ensure comprehensive capacity development and equitable access to data, information, knowledge and technology across all aspects of ocean science and for all stakeholders.

7. Describe how your Ocean-Shot addresses the selected challenges (150 word limit).

Partnering with a broad spectrum of diverse end-user community stakeholders, JEDI Aquanautics will create a world-class state-of-the-art, socio-technical, open-access platform (testbeds and toolkits coupled with convergence research and cyberlearning infrastructure) catalyzing a JEDI global NBE. We will leverage the NSF Holodeck's human-centered digital infrastructure to ensure equitable access to data and information tools, globally. An international community of JEDI Inventioneering ambassadors will democratize knowledge and technology, fostering new discoveries and social innovation via Massive Open Online Courses (MOOCs), across all aspects of ocean science. We will advance novel use-inspired cross-cutting applications, for all stakeholders, throughout the NBE. JEDI Aquanautics will provide unprecedented socio-technical capacity to better understand ocean environments and sustainable utilization of resources in the context of changing environmental, social, and climate conditions. JEDI Aquanautics (platform, inventioneering, and NIC) will equip the next generation of ocean scientists and innovators to succeed at our societal grand challenges (UN SDGs).

8. Vision and potential transformative impact (200 word limit):

JEDI Aquanautics is a paradigm shift with the potential to catalyze a vibrant JEDI NBE:

Mission Log (2022): We pass samples collected from 60,000-year-old sunken forests, up through the habitat's moon pool for genetic sequencing in real-time. Our collaborative robot dive team partners deliver samples as heads up displays visualize results, vastly improving the life-saving discoveries our JEDI bio-prospecting team can achieve. The NSF Holodeck fuses data from multimodal sensors (ecological, archeological, genetic, physiological) into a cohesive whole, while cameras on robots and head mounted displays connect divers with remote community participants, globally.

Mission Log (2023): We have the capabilities of a next-generation Aquarius Reef Base (on the deck of the USS Monitor (Channel Islands/60m); allowing us to investigate threatened cultural heritage sites and traditional cultural landscapes. Most profound was our ability to connect elders of the various Chumash groups to 20,000-year-old cave sites, where they bore witness to the final resting place of their ancestors. This once in a lifetime journey is shedding new insight—for the elders, their nation, America, and the world—on where we came from and where early Americans lived during the Last Glacial Maxima when ocean levels were 120+m lower than today.

9. Realizable, with connections to existing U.S. scientific infrastructure, technology development, and public-private partnerships (150 word limit):

Connecting with existing scientific infrastructure and technology development will fortify the success of JEDI Aquanautics. We will leverage the strength of highest-end state-of-the-art instruments (NSF Holodeck and Ocean Space HabitatSM) and ABET's Innovation Award Winning Vertically Integrated Projects (VIP) Consortium. Partnerships across our world-class JEDI Aquanautics team—experts from academic, government (NSF, NASA, NOAA, DOE), industry R&D, and community-based non-profit organizations—will advance national and international grand challenge priorities. NSF Holodeck's network of 15 industry and 30 academic partners will empower diverse teams—JEDI Inventioneers—across the world to collaborate, in real-time, asynchronously, continuously, and longitudinally. We will advance multiple NSF priorities: INCLUDES, NSF Big Ideas, Future of Work at the Human-Technology Frontier, Harnessing the Data Revolution, Industrial Innovation and Partnerships, and interagency activity. We will empower high-risk/high-reward convergence research spanning every NSF directorate, substantially increasing human access to, and understanding of, ocean environments and sustainable resource utilization.

10. Scientific/technological sectors engaged outside of traditional ocean sciences (100 word limit):

JEDI Aquanautics will bring the full power of the NSF Holodeck (Major Research Instrumentation [MRI] Award #1626098, PI Burleson) to the NBE. Inspired by Star Trek's Holodeck, the NSF Holodeck was the only large-scale Computer and Information Science and Engineering MRI awarded, nationally in 2016. NSF Holodeck incorporates visual (AR/VR, Mixed-Reality), auditory, and physical components (mapping, motion-capture, and robotics) to enhance collocated and distributed collaboration and cyberlearning (remote/global participation and virtual field trips). The NSF Holodeck's cyber-social-physical infrastructure provides robust and unparalleled capacity to collect, aggregate, process, interpret and distribute data and create novel cyber-enabled JEDI NBE experiences.

11. Opportunities for international participation and collaboration (100 word limit):

JEDI Aquanautics will engage millions of people as global citizen-scientists, advancing all seven of the UN Ocean Decade's societal outcomes. We will create significant opportunities for international participation and collaboration via community partner networks (LEGO Foundation, VIP Consortium in 12 countries) and high-profile media coverage (National Geographic Society 2012, 2019; Discovery's Shark Week 2021). JEDI Inventioneering's open-access VIP-MOOCs will enable anyone, anywhere, to engage in JEDI Aquanautics. Novices and experts, alike, with support from peer-mentor ambassadors, will become JEDI Inventioneers—engaging in passion-based exploration and discovery. Collectively, JEDI Aquanautics' global community will contribute diverse end-user-expertise, critical to solving societal grand challenges.

12. Develops global capacity and encourages the development of the next generation of ocean scientists (100 word limit):

JEDI Inventioneering will dramatically increase the full participation of women and under-represented groups in highest-end world-class convergence research, internationally. Diverse teams, equipped with state-of-the-art resources, will partner with multi-stakeholder communities and end-users. As JEDI Inventioneers advance in their expertise, they will become JEDI STEM ambassadors and peer-mentors. The unique combination of a low-cost, state-of-the-art, world-class, broadly replicable JEDI Aquanautics Platform, coupled with our international JEDI Inventioneering initiative and JEDI Aquanautics NIC's sustainable leadership, will foster the robust global sociotechnical capacity critical to empowering the next generation of ocean scientists as pioneers equipped to succeed at society's grand challenges (UN SDGs).

2. Thank You!

Thank You Email

Jul 01, 2021 14:24:12 Success: Email Sent to: win@arizona.edu